E. H. FISHER.

GAS BURNER.

APPLICATION FILED JAN. 15, 1920.

1,364,094. Patented Jan. 4, 1921.

FIG.1.

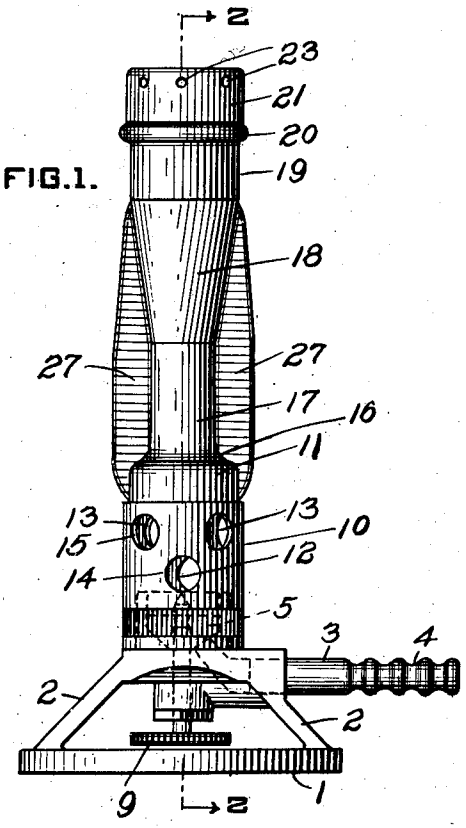


FIG.2.

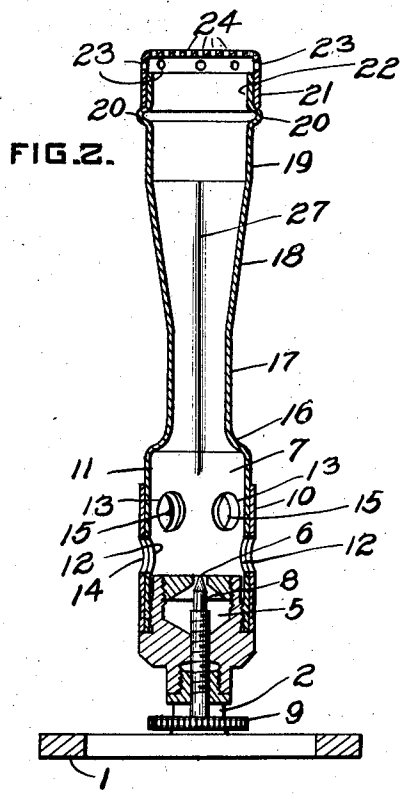


FIG.4.

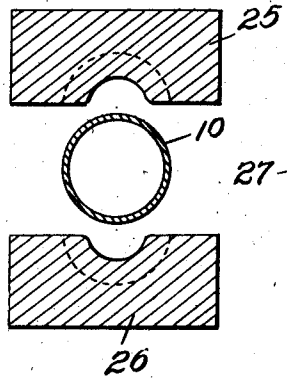


FIG.3.

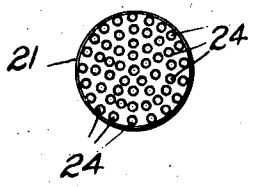
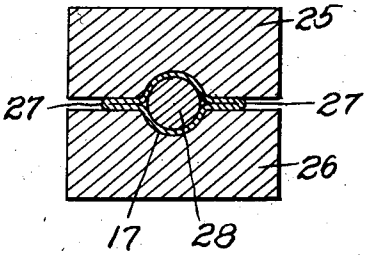


FIG.5.



WITNESSES

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GAS-BURNER.

1,364,094. Specification of Letters Patent. Patented Jan. 4, 1921.

Application filed January 15, 1920. Serial No. 351,569.

To all whom it may concern:

Be it known that I, EDWIN H. FISHER, a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Gas-Burners, of which the following is a specification.

This invention relates to gas burners, and particularly to such burners used for producing a flame of intense heat for laboratory purpose.

Among the objects of this invention are to provide an improved form of grid for such burners for the purpose of preventing a flare-back of the flame; and a new method of forming the mixing tube of such a burner. A further object is to provide a tube for such burners, shaped from a piece of plain sheet metal tubing, but of varying size and cross section, to form a suitable mixing chamber.

Referring to the drawings Figure 1 is a perspective of a complete burner with all parts in position, and with the interior parts indicated by dotted lines; Fig. 2 is a central vertical section on the line 2—2, Fig. 1; Fig. 3 is a plan view of the burner cap; Fig. 4 is a cross sectional view of a pair of dies used for forming the particular shaped burner tube shown in Figs. 1 and 2, the dies being in open position with a tube blank therein; and Fig. 5 shows the dies in closed position after forming the tube.

The burner illustrated herein is of the ordinary laboratory type, such as that illustrated in my prior Patent No. 1,051,367, issued January 21, 1913. It comprises a base 1 adapted to seat upon any flat surface, supporting arms 2, and a lead-in pipe 3 having a terminal portion 4, adapted to be attached to a rubber hose leading to any suitable source of combustible gas. It will be readily understood that the pipe 3 may be an ordinary gas pipe permanently attached, and that the source of gas may be any desired. The burner is not limited in any respect to particular uses, fuels, or attachments.

The gas supply is led from pipe 3 into the small chamber 5, and passes therefrom by a restricted outlet 6, into the main mixing chamber 7. The outlet 6 is controlled by a needle valve stem 8, which is adjusted by means of thumb screw 9, as will be readily understood. A rotatable sleeve 10 surrounds a barrel portion 11 of a tube forming the main body of the burner. This barrel portion 11 forms the mixing chamber 7, above referred to. It has sets of lateral perforations 12 and 13, and the sleeve 10 fitted therearound has corresponding perforations 14 and 15, adapted to register with the perforations in the barrel 11. By rotating the sleeve 10 the size of the openings from free air into the mixing chamber 7 is regulated, and thereby the amount of air drawn into this mixing chamber is controlled, as is well known.

Above the mixing chamber 7 the burner tube is restricted by an in-turned shoulder 16, and thereafter follows a reduced tubular portion 17 of a diameter approximately one-half that of the tube surrounding the mixing chamber. Above this tubular portion 17 there is a conical portion 18 of upwardly increasing diameter, terminating in a second cylindrical portion 19 of the same diameter as the barrel 11. An annular external bead or shoulder 20 is formed in thus tubular portion 10, and is adapted to form a seat for the cap member 21, which is of a size to slip on and off the portion 22 of the burner body above the shoulder 20.

The cap 21 is made of sheet metal of approximately the same thickness as the main burner tube. The base of the cap is perforated, as shown in Fig. 3, and the side walls near the base are also perforated, to form a series of lateral openings 23. The perforations in the base of the cap are numbered 24. As shown at the top of Fig. 2 the lateral perforations in the cap are spaced to come just above the top of the burner body 22, when the cap is in normal position seated on the shoulder 20.

I have found that a cap of the form shown and described herein may be substituted for the grid illustrated and described in my said prior patent, with most of the benefits of my said prior construction, and with a great saving in the cost of manufacture of the present cap over that of the original grid. In its present form it may be punched out of sheet metal and the perforations formed, in what is substantially a single operation. The positioning of the lateral perforations 23 permits the drawing of air into the burner body just beneath the grid 24, and

the draft produced by the rapid passage of gas through the burner and through the perforation 24 will draw a considerable amount of air through the lateral perforations. The result is a flame of increased temperature, while at the same time, the position of these holes prevents the tendency of the flame to flare back into the mixing chamber, *i. e.*, to prevent combustion of gas inside the burner. The grid breaks up the flame, and prevents the localization of the heating effect thereof, and gives a large intensely hot flame above the entire surface of the cap.

It has been found that the particular form of burner tube illustrated, comprising an enlarged mixing chamber, a restricted outlet thereabove, a smaller tubular section, and then a gradually increasing section, is the most effective in burners of this type adapted to produce intense heat, and through which the gas is forced rapidly under considerable pressure.

Ordinarily such tubes have been formed by spinning the enlarged portions from standard tubing stock of the diameter of the smallest section of the finished burner. That is, tubes of the diameter of the portion 17 in the present case, have had their enlarged portions 11, 18, and 19 formed by spinning these portions up from a length of tubing of uniform original size, corresponding to the section 17. The present invention departs from that method, and the same result is secured much more economically by taking a length of tubing of uniform diameter corresponding to that of the larger barrel portions 11 and 19, and forming the restricted portions 16, 17 and 18 by clamping the middle portion of the tube between dies 25 and 26, which have faces corresponding to the exterior of portions 16, 17 and 18 of the finished burner body. A suitable mandrel 28 may be positioned inside the tubing to secure exact formation thereof, though the mandrel is not essential to the operation. As a result of the clamping of the dies together, the excess metal of the tubing is formed into lateral folds 27, as shown in Figs. 1 and 5, and the interior is formed into the desired restricted shape, as shown in Fig. 2. A great saving in the cost of manufacture is possible by this method, while it secures all the advantages of the old structure. It has the additional advantage of making a stronger structure, since the folds act as a reinforcement and also give a better hand hold for handling the device, as well as adding to its general appearance of neatness and strength.

The many advantages of the present invention will be apparent to those familiar with the art.

I claim:

1. The combination with a gas burner of a sheet metal cap adapted to seat on the top of the burner and having its top perforated, said cap having unrestricted lateral perforations positioned above the top of the burner body, and immediately below the top wall of the cap, whereby to admit air beneath said top wall.

2. In a gas burner the combination with a burner body of a perforated cap adapted to fit on top of the burner body, means to accurately position the cap upon the burner body, said cap having a series of unrestricted lateral perforations positioned immediately below the perforated top of the cap.

3. A gas burner comprising a gas and air mixing chamber, a cylindrical burner body leading from the mixing chamber, an exterior bead on the burner body, a sheet metal cap adapted to fit over the end of the burner body and to be accurately positioned relative thereto by said bead, perforations in the top of the cap, and unrestricted lateral perforations in the sides of the cap positioned above the top of the burner body and immediately below the top of the cap.

4. A tubular gas burner body member having an enlarged portion adapted to form a mixing chamber for the burner, an enlarged portion adapted to form the outlet of the burner, and intermediate folds in the walls of the tube between said enlarged portions forming a restricted section therebetween.

5. A barrel for gas burners comprising a metal tube having its end portions of the original tube diameter, said end portions being connected by a restricted intermediate portion comprising a conical shaped section, said restricted portion being formed by folding upon themselves portions of the tube walls.

In testimony whereof I have hereunto set my hand.

EDWIN H. FISHER.

Witnesses:

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